



(12) **Patent Application Publication**  
**Clarke**

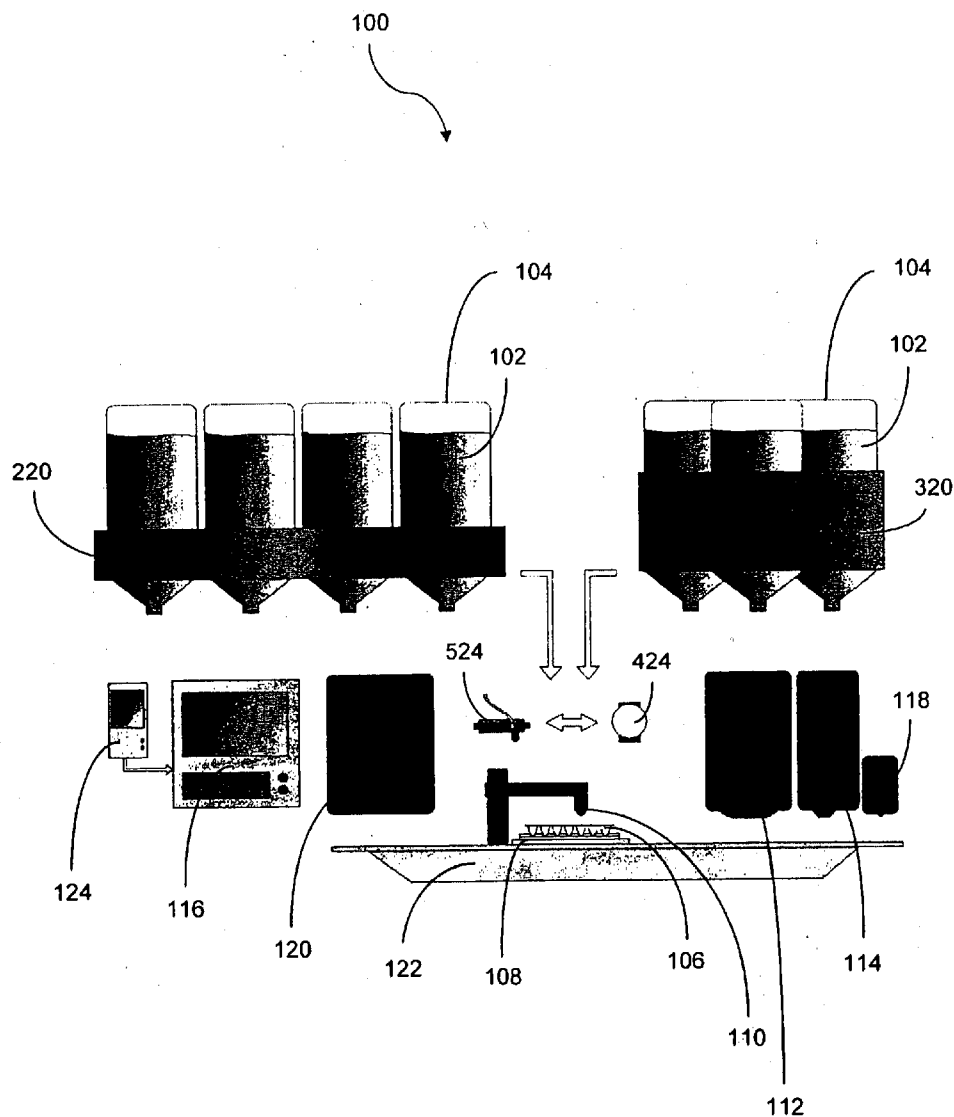
(43) **Pub. Date:** **Sep. 13, 2012**

Nov. 19, 2009 (AU) ..... 2009905665

§ 371 (c)(1),  
(2), (4) Date: **May 18, 2012**

(57) **ABSTRACT**

A system and method for delivering liquid medicine from a bulk storage supply into an integral array of single dosage liquid medicine containers with control of the relative position of a dispensing point and a platform supporting the array of single dosage containers, and racking the array of containers in a storage device.



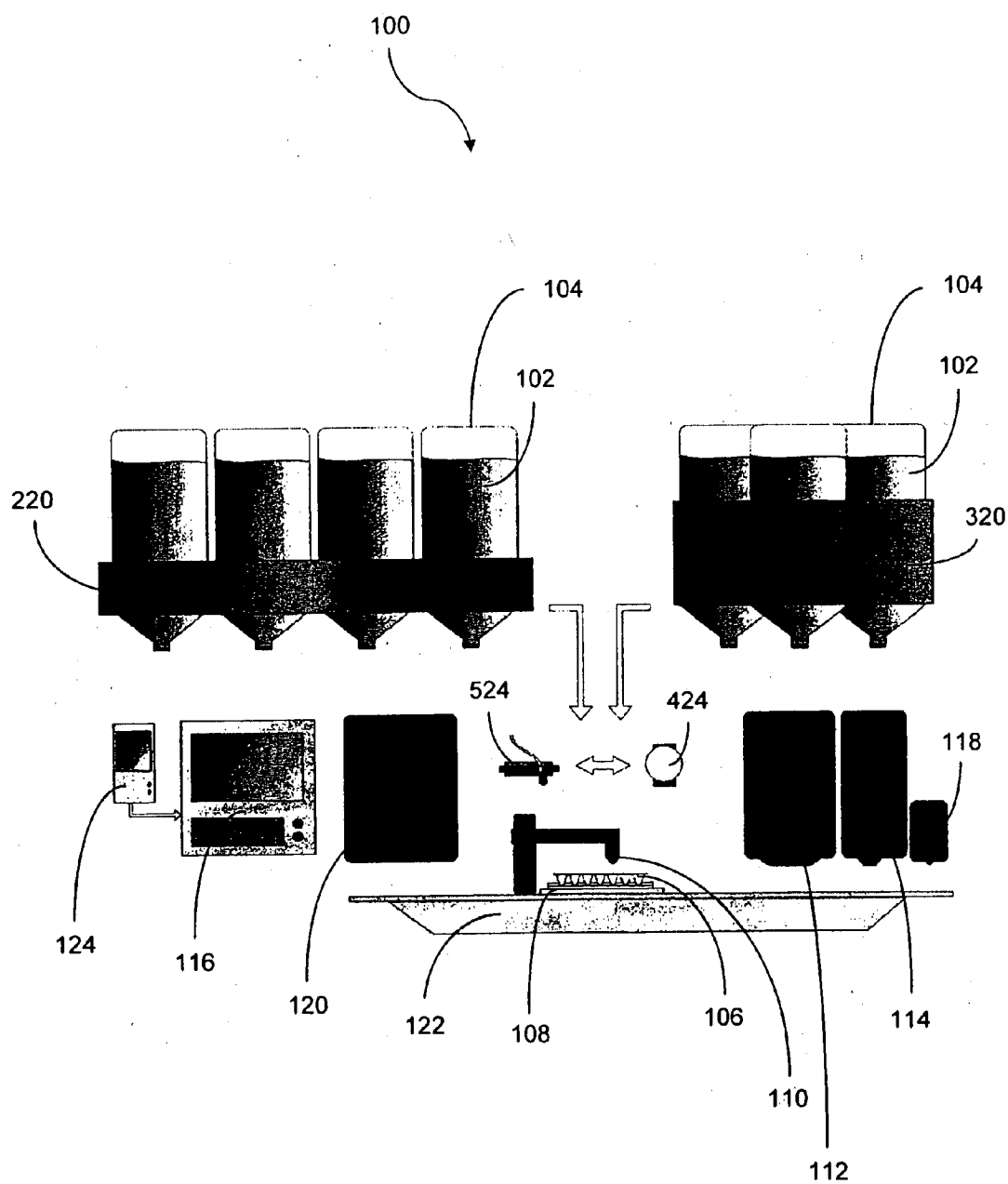
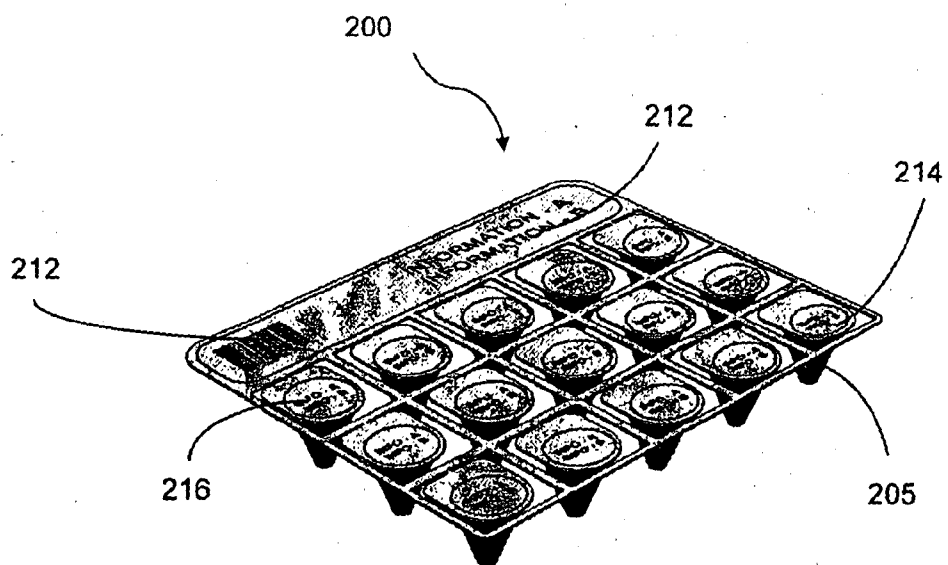
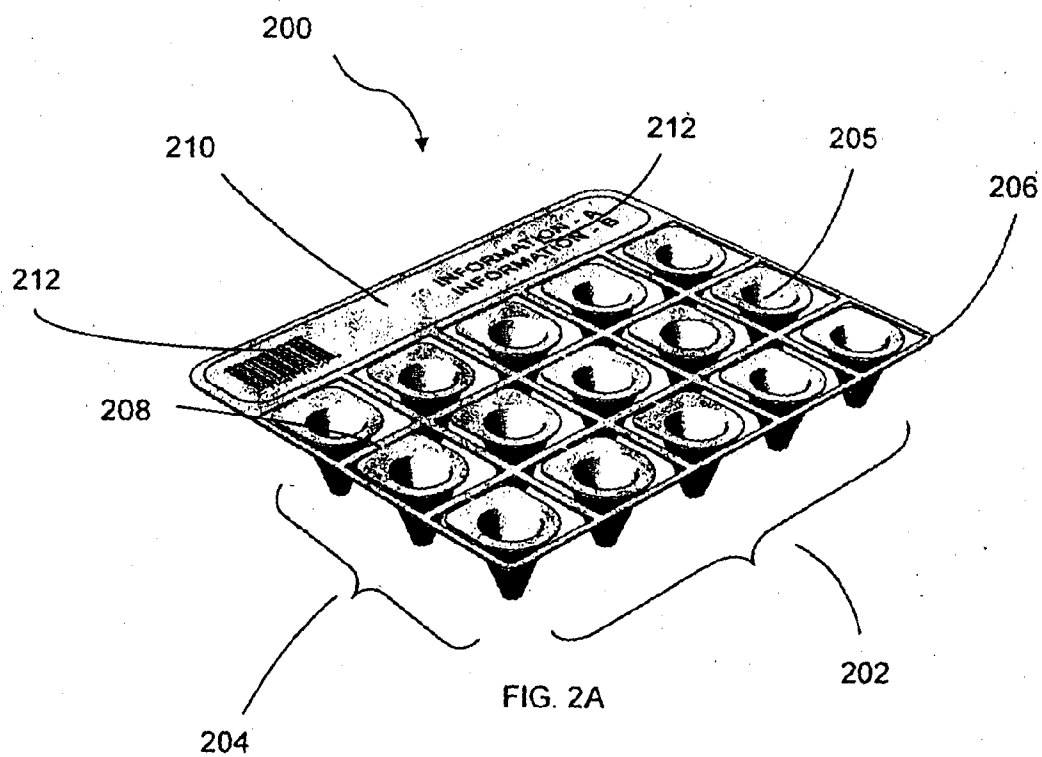


FIG. 1



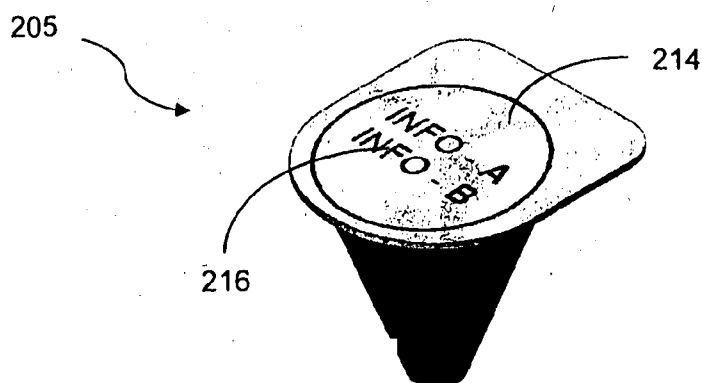


FIG. 2C

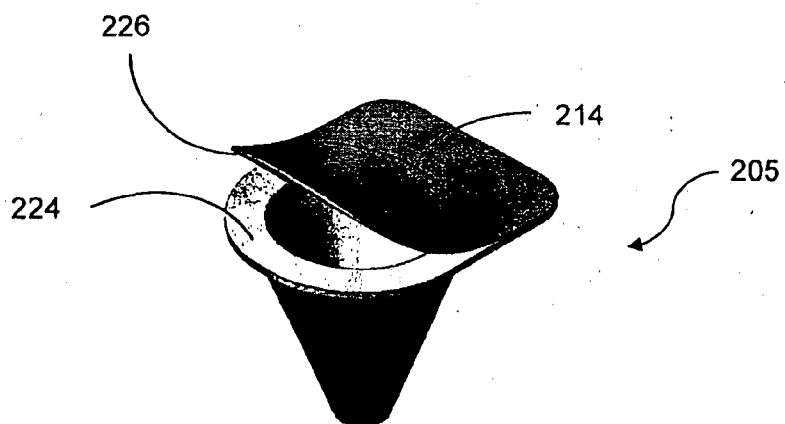


FIG. 2D

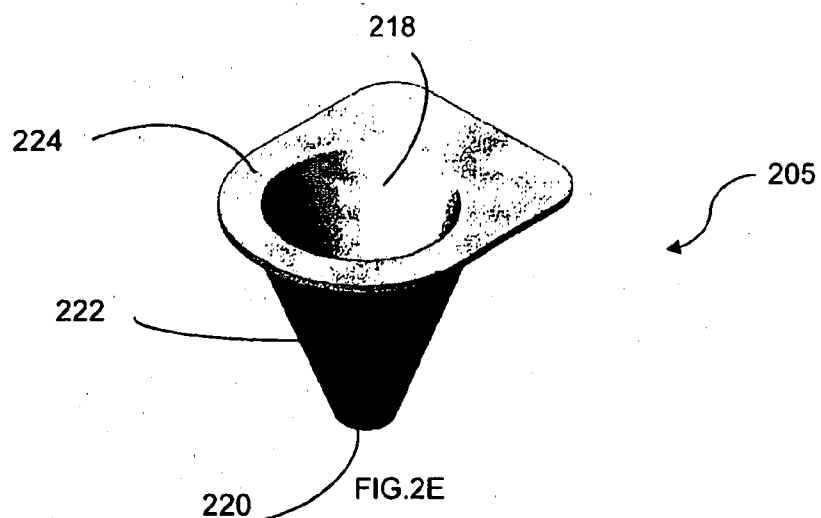


FIG. 2E

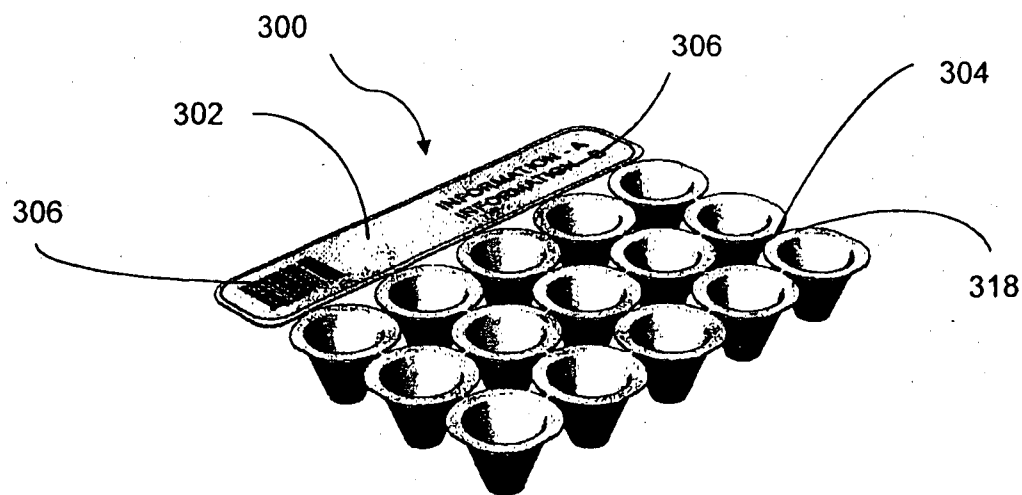


FIG. 3A

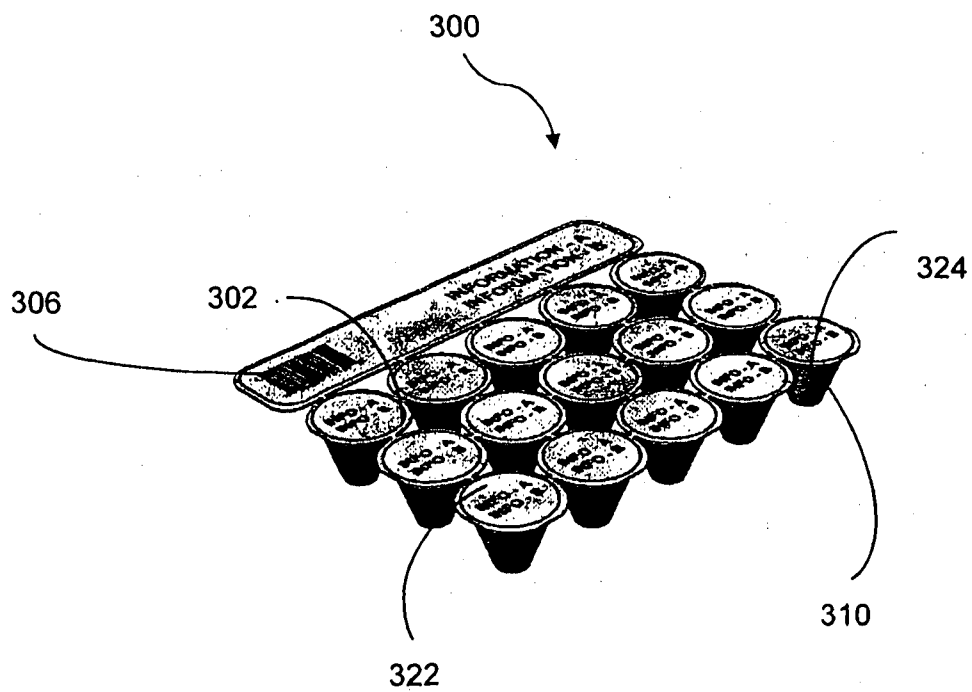
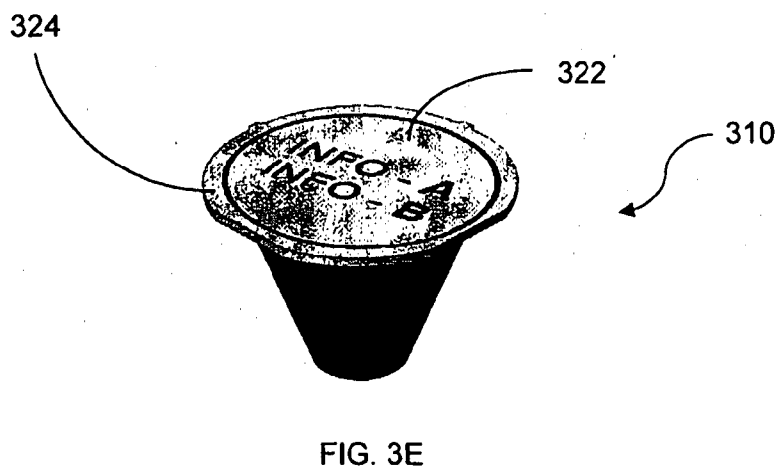
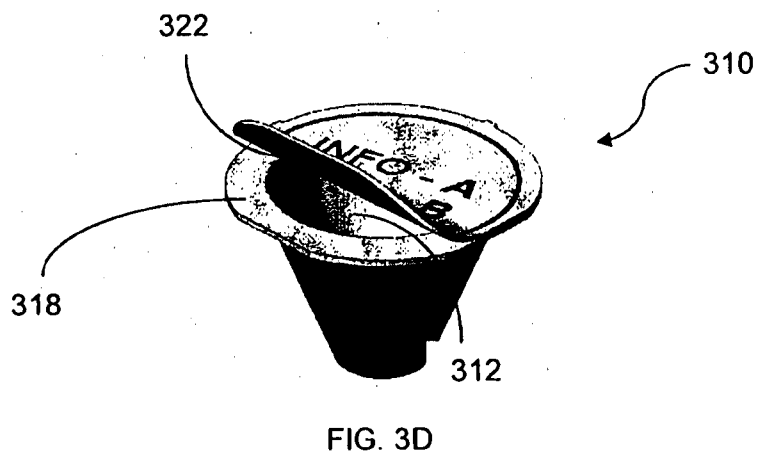
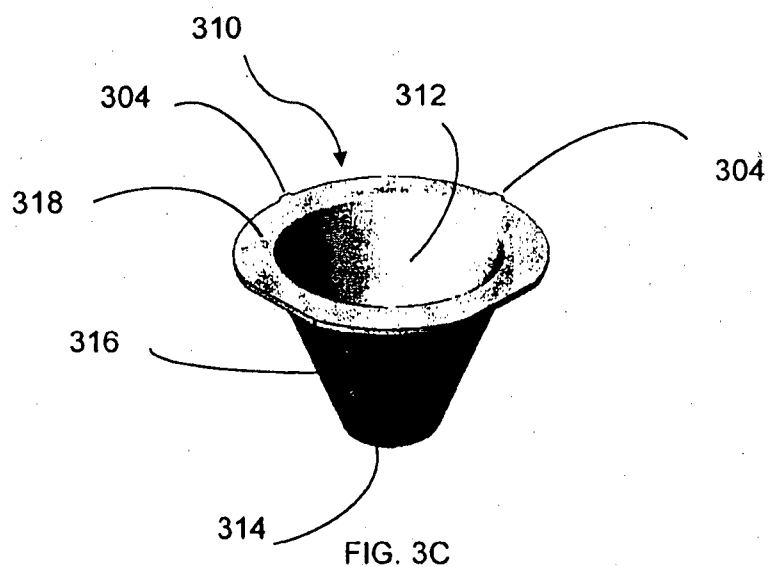


FIG. 3B



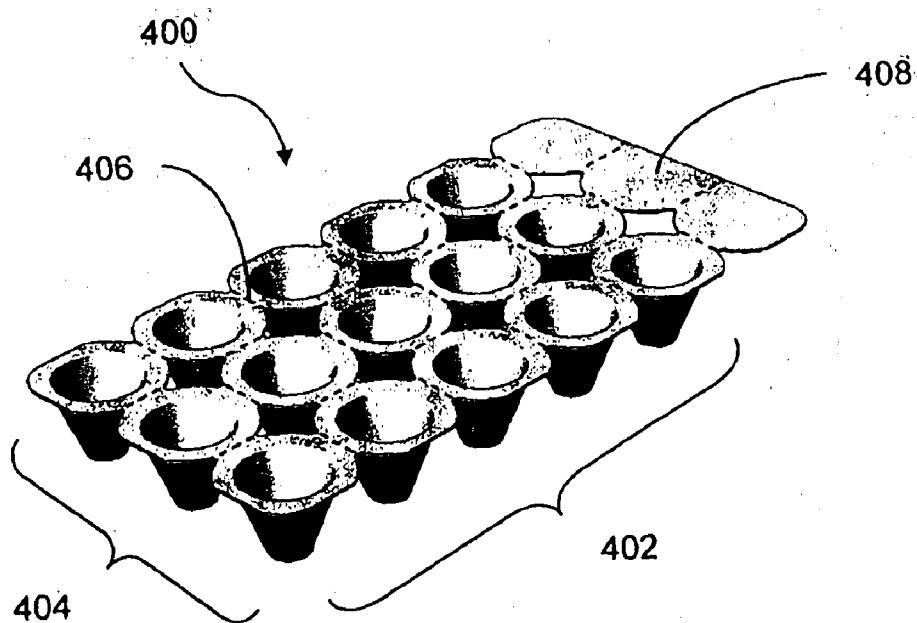


FIG. 4A

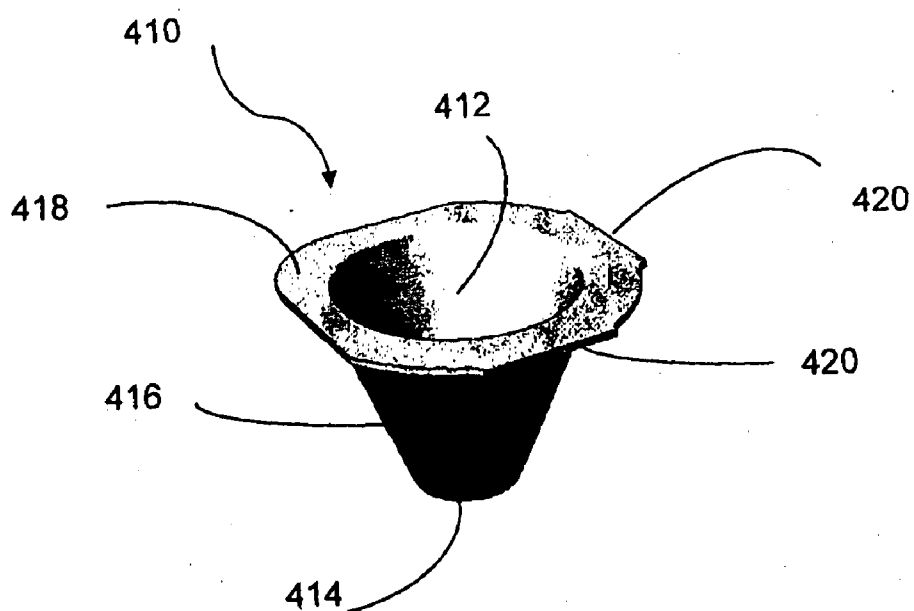


FIG. 4B

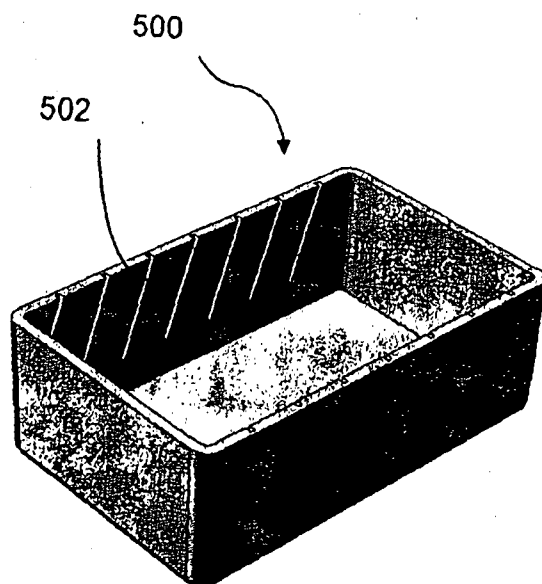


FIG. 5A

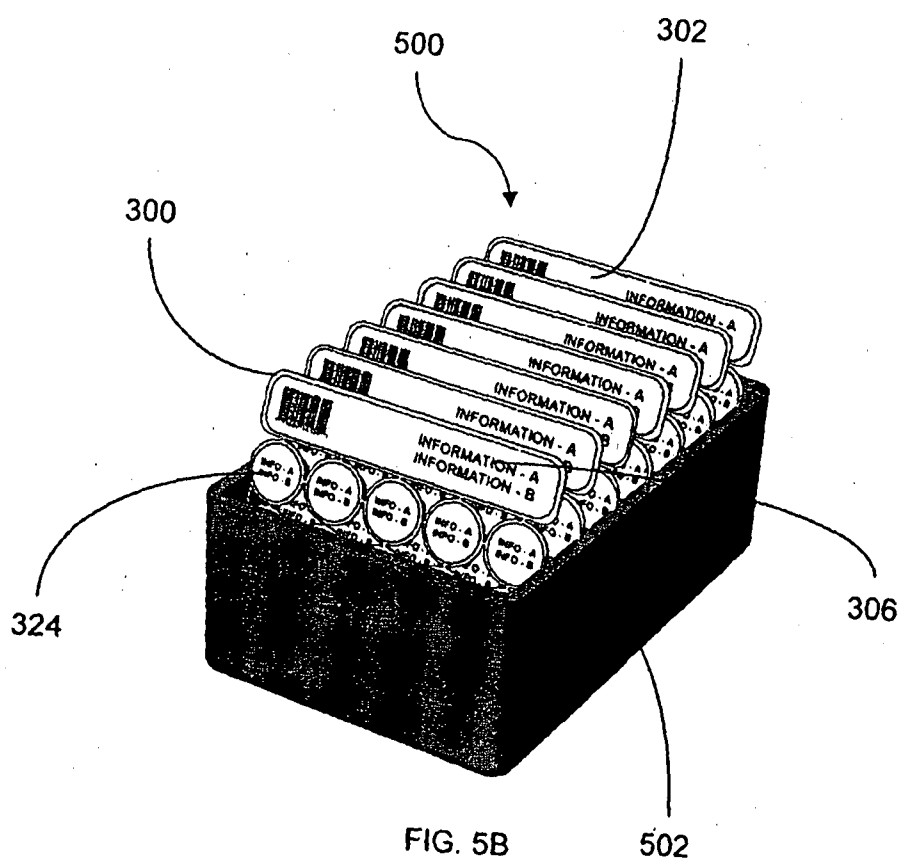


FIG. 5B



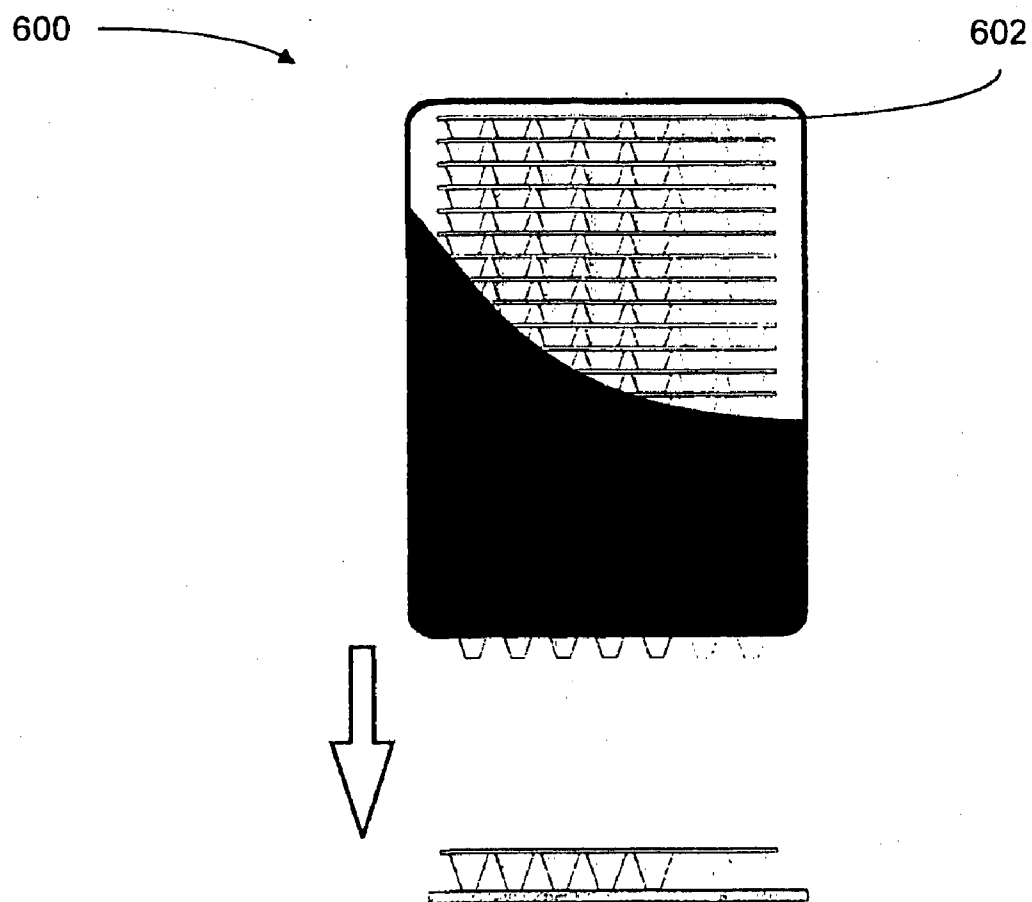


FIG. 6

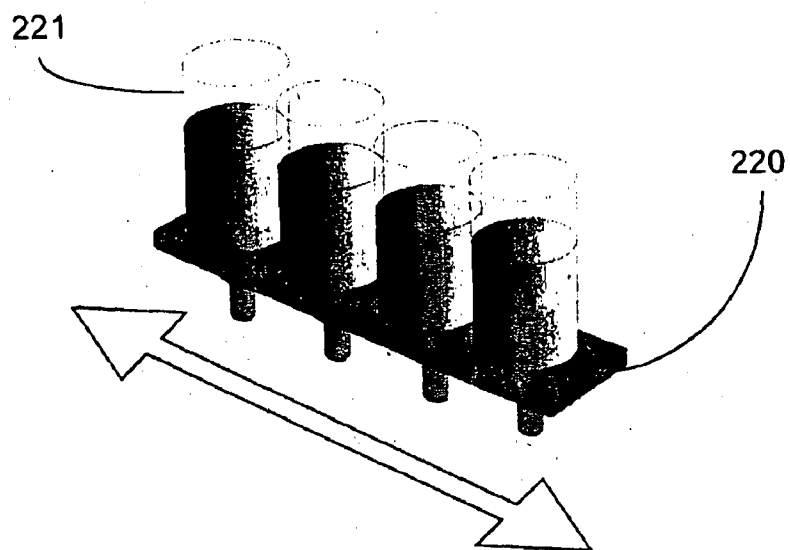


FIG. 7A

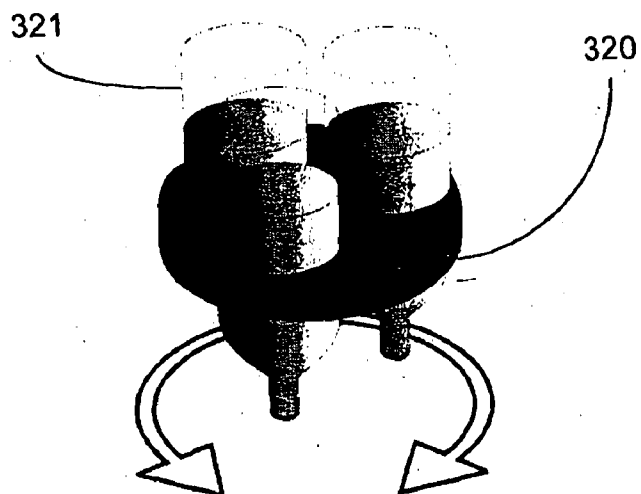


FIG. 7B

## METHOD AND APPARATUS FOR LIQUID DOSING SYSTEM

### BACKGROUND OF THE INVENTION

**[0001]** 1. Field of the Invention

**[0002]** The present invention generally relates to a liquid dosing system for the delivery of pharmaceutical liquid into dosage containers.

**[0003]** 2. Discussion of the Background Art

**[0004]** In the pharmaceutical industry of liquid medication, liquid medicine is initially packaged in bulk storage containers for shipment to pharmacies or health care settings. Individual dosing of the liquid medicine is often carried out in health care settings by qualified staff members. Typically, a bulk storage container, such as a bottle, is stored on a ward and the staff member has to open the bottle and measure the dose to be administered into a calibrated cup. Unlike other packaging industries, such as the packaging of foods and beverages, the packaging of liquid medicine into single dosage units requires a great deal of accuracy and a high level of sterility. Such dosing liquids is a time-intensive and tedious task requiring multiple steps and a great deal of diligence on the part of the staff member charged with the task.

**[0005]** Some existing automated packaging devices provide means for single unit dosage packaging in the form of a dispenser for dispensing liquid medicine into individual unit dosage containers. Such packaging devices use various individual steps to fill the individual unit dosage containers, such as mini cups; then seal the individual containers one by one; and then print information on the seal of each individual container. These packaging devices are inefficient as they require manual user input at almost every stage of the packaging process. In these existing types of packaging devices, the degree of sterility is lessened with each requirement for human interaction. Furthermore, packaging devices which produce single unit dosage cups present problems for storage and transport of the final products.

**[0006]** The present invention reduces or ameliorates one or all of the above problems of conventional manual and automated packaging methods.

### SUMMARY OF THE INVENTION

#### Disclosure of the Invention

**[0007]** In accordance with the present invention, a liquid dosing system delivers liquid medicine from a bulk supply into single dosage liquid medicine containers. The liquid dosing system comprises one or more dispensing points for filling single dosage liquid medicine containers of an array of single dosage liquid medicine containers with liquid medicine from the bulk supply; a platform for supporting the array of single dosage liquid medicine containers; and a control device for controlling the relative position of the dispensing point and the platform.

**[0008]** The single dosage liquid medicine containers of an array can be removably joined to each other via frangible tabs, such that a detached single dosage container is absent of residual sharp edges. The containers are preferably sealed and may be provided with a removable tamper proof closure. The containers may be labelled with printed information relating the liquid medicine contained therein.

**[0009]** Embodiments of the present invention include a liquid medicine delivery system comprising a racking or storage device for racking or storing the array of single dosage liquid

medicine containers. Printed information remains to be visible even when the array of single dosage liquid medicine containers is placed in the racking or storage device.

**[0010]** Other embodiments of the present invention further include a user input device for controlling the delivery of the liquid medicine.

**[0011]** Further embodiments of the present invention include a reader adapted to provide feedback to the user. The reader may comprise of a digital or optical reader and may be configured to provide feedback to the user via the user input device.

### BRIEF DETAILS OF THE DRAWINGS

**[0012]** In order that this invention may be more readily understood and put into practical effect, reference, will now be made to the accompanying drawings, which illustrate preferred embodiments of the invention, and wherein:

**[0013]** FIG. 1 provides an illustration of a liquid dosing system according to two embodiments of the invention;

**[0014]** FIG. 2A provides an illustration of an uncovered array of single dosage liquid medicine containers according to one embodiment of the invention;

**[0015]** FIG. 2B provides an illustration of a covered array of single dosage liquid medicine containers according to the invention corresponding to FIG. 2A;

**[0016]** FIG. 2C provides an illustration of a covered single dosage liquid medicine container according to the embodiment of the invention corresponding to FIGS. 2A and 2B;

**[0017]** FIG. 2D provides an illustration of a single dosage liquid medicine container with a partially peeled off cover according to the embodiment of the invention corresponding to FIGS. 2A to 2C;

**[0018]** FIG. 2E provides an illustration of an open single dosage liquid medicine container according to the embodiment of the invention corresponding to FIGS. 2A to 2D;

**[0019]** FIG. 3A provides an illustration of an uncovered array of single dosage liquid medicine containers according to one embodiment of the invention;

**[0020]** FIG. 3B provides an illustration of a covered array of single dosage liquid medicine containers according to the invention corresponding to FIG. 3A;

**[0021]** FIG. 3C provides an illustration of a covered single dosage liquid medicine container according to the embodiment of the invention corresponding to FIGS. 3A and 3B;

**[0022]** FIG. 3D provides an illustration of a single dosage liquid medicine container with a partially peeled off cover according to the embodiment of the invention corresponding to FIGS. 3A to 3C;

**[0023]** FIG. 3E provides an illustration of an open single dosage liquid medicine container according to the embodiment of the invention corresponding to FIGS. 3A to 3D;

**[0024]** FIG. 4A provides an illustration of an uncovered array of single dosage liquid medicine containers according to one embodiment of the invention;

**[0025]** FIG. 4B provides an illustration of an open single dosage liquid medicine container according to the embodiment of the invention corresponding to FIG. 4A;

**[0026]** FIG. 5A provides an illustration of an empty liquid medicine dosage container storage tray according to one embodiment of the invention;

**[0027]** FIG. 5B provides an illustration of a racked liquid medicine dosage container storage tray according to one embodiment of the invention.

[0028] FIG. 6 provides an illustration of a dispensing hopper according to the invention corresponding to FIG. 1;

[0029] FIG. 7A provides an illustration of a plurality of bulk liquid medicine storage containers in a rotary support according to the invention corresponding to FIG. 1; and

[0030] FIG. 7B provides an illustration of a plurality of bulk liquid medicine storage containers in an in-line support according to the invention corresponding to FIG. 1.

#### DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0031] Two embodiments of the present invention are illustrated with reference to FIG. 1. In both embodiments of the invention, there is provided a system 100 for delivering liquid medicine 102 from a bulk supply 104 into an array 106 of single dosage liquid medicine containers.

[0032] The bulk supply 104 is shown to be in the form of one or more bulk storage containers. However, in an alternative embodiment, the bulk supply 104 can be in the form of a pipe or a hose supplying liquid medication from a remote location.

[0033] The first exemplary embodiment shows a moveable support 220 for holding a number of bulk storage containers 104 and moving a selected container into a desired position. In this first exemplary embodiment, the moveable support 220 is in the form of a linear support mechanism, which, for example, can work on the basis of a conveyor system.

[0034] The second exemplary embodiment also shows a movable support 320 for holding a number of bulk storage containers 104 and moving a selected container into a desired position. However, in this second exemplary embodiment, the moveable support 320 is in the form of a rotary support, such as a carousel or a cassette, for example.

[0035] Each array 106 of single dosage liquid medicine containers may be an integral one or two-dimensional array. According to these exemplary embodiments of the present invention, each array 106 of single dosage liquid medicine containers is supported by platform 108. Platform 108 is moveable over platform support 122 such that the position of platform 108 can be controlled relative to the position of dispensing point 110. In an alternative embodiment, dispensing point 110 is moveable such that its position is controlled relative to platform 108. In yet another alternative embodiment, the position of both platform 108 and dispensing point 110 is controlled relative to one another. Dispensing point 110 fills each array 106 of single dosage liquid medicine containers with liquid medicine 102 from bulk storage supply 104.

[0036] Each array 106 of single dosage liquid medicine containers is configured to be stacked inside dispensing hopper 120. At the beginning of the filling, sealing and labelling process, dispensing hopper 120 dispenses one array 106 of single dosage liquid medicine containers onto carrier platform 108 for movement towards dispensing point 110.

[0037] In one embodiment of the present invention, dispensing point 110 may be configured as a single nozzle adapted to discharge liquid medicine 102. In an alternative embodiment of the present invention, dispensing point 110 may be configured as an array of nozzles adapted to discharge the liquid medicine at a plurality of points. The array of nozzles may be configured as a one or two-dimensional array.

[0038] In yet another alternative embodiment of the present invention, there may be a plurality of separate dispensing points. In this exemplary embodiment, the system may be configured to select from the plurality of dispensing points or use more

than one dispensing point at the same time to fill an array of single dosage liquid containers with liquid medicine from a selected bulk storage supply. Such a dispensing system could include control over which of the plurality of dispensing points are used for different sized arrays of single dosage liquid medicine containers. For example, an array of 5x3 single dosage liquid medicine containers could be filled by activating 3 dispensing points or 5 dispensing points depending on its orientation.

[0039] With reference to FIG. 1, according to one embodiment of the present invention, system 100 is provided with peristaltic pump 424 for supplying liquid medicine 102 to dispensing point 110.

[0040] Also shown in FIG. 1, is an alternative embodiment where system 100 is provided with pinch tube valve 524 for supplying liquid medicine 102 to dispensing point 110.

[0041] The system 100 of the present invention includes a sealing component 112 for sealing an array 106 of single dosage liquid medicine containers and a printing or labelling component 114 for labelling the array 106 of single dosage liquid medicine containers with printed information relating to the liquid medicine contained therein. The information printed on the array 106 of removably joined single dosage liquid medicine containers may contain details relating to: content, dose volume, dose information, patient name, patient address, doctor, batch and expiry information, colour code, and/or identification code.

[0042] In an alternative embodiment of the present invention, printing may be done prior to adhesion of the seals to the array 106 of single dosage liquid medicine containers.

[0043] In yet another alternative embodiment of the present invention, labelling component 114 may be an RFID writer. In this exemplary embodiment, labelling component 114 is configured to write data to an RFID tag either embedded or attached to each array 106 of single dosage liquid medicine containers. Akin to the printed information, the written data may contain details relating to: content, dose volume, dose information, patient name, patient address, doctor, batch and expiry information, colour code, and/or identification code.

[0044] Also shown in FIG. 1, user input device 116 is used to control the delivery of liquid medicine into the array 106 of single dosage containers. The user input device 116 can be adapted to utilise input from external sources. According to the embodiment in FIG. 1, the user input device 116 is shown to be in the form of a computer. The user input device 116 can be used to control:

[0045] the position of dispensing point 110 or plurality of dispensing points;

[0046] the activation of a selection of dispensing points in the case of a plurality of dispensing points;

[0047] the dispensing of an array of single dose containers from the dispensing hopper 120;

[0048] the position of the carrier platform 108;

[0049] the selection of a bulk storage container 104;

[0050] the activation of peristaltic pump 424 or pinch tube valve 524;

[0051] the sealing component 112;

[0052] the labelling component 114; or

[0053] any other part of the process involved in dispensing liquid medicine 102 from a bulk supply 104 into an array 106 of single dosage containers.

[0054] User input device 116 not only controls all stages of system 100, but also provides feedback to the user on the status of system 100 during operation.

[0055] In one embodiment of the invention, where bulk storage containers 104 are delivered full of liquid medicine 102, barcode reader 124 is used to scan bulk storage containers 104 to ensure that the correct drug (liquid medicine) and strength is being used. Scanning of bulk storage containers 104 can also be used to provide the user input device with batch and expiry data.

[0056] In an alternative embodiment, where liquid medicine is delivered, in an original container (not shown) for filling of bulk storage containers 104 in system 100, barcode reader 124 is used to scan the original container to ensure that the correct drug (liquid medicine) and strength is being used. Once the drug is verified, the user may key in batch and expiry data into user input device 116.

[0057] System 100 illustrated in these embodiments of the present invention also includes optical or digital reader 118 for checking the final product prior to dispatch or storage. Optical or digital reader 118 can be configured to check the printed information or the data on the RFID tag on each array 106 of single dosage liquid medicine containers and verify the accuracy and completeness of the filling, printing and sealing process.

[0058] With reference to FIG. 2A, an integral array of single dosage medicine containers 200 is shown in a planar formation. In this exemplary embodiment, the array of single dosage containers 200 is shown to comprise of fifteen removably joined single dosage medicine containers, whereby the array of single dosage containers comprises a matrix of five single dosage medicine containers 202 in a first dimension and three single dosage medicine containers 204 in a second dimension. In this exemplary embodiment, the array of single dosage containers 200 comprises frame 206 which borders each of the single dosage containers 205. The array of single dosage containers 200 further comprises frangible bridging portions 208 removably joining each single dosage container 205 to frame 206. The array of single dosage containers 200 also comprises tab portion 210 displaying information 212. In FIG. 2A, information 212 is shown as printed information. However, in an alternative embodiment of the invention, information 212 may in be in the form of an RFID tag, or in the form of both printed information and RFID tag. The RFID tag can be either embedded or attached to either tab portion 210 of the array 200; or cover 214 of the array 200.

[0059] In an alternative embodiment of the invention, the array of single dosage containers 200 has an outer frame bordering the outer circumference of the array.

[0060] Frangible bridging portions 208 allow for any of the single dosage containers 205 to be removed, one at a time, from the array of single dosage containers 200 regardless of its position relative to other single dosage containers. The array of single dosage containers 200 is configured such that removal of a single dosage container 205 leaves frangible bridging portion 208 attached to frame 206. As will be described with reference to FIGS. 2C to 2E, this provides a discrete single dosage container 205 that is free of residual edges.

[0061] In FIG. 2B there is shown an array of single dosage medicine containers 200 wherein the containers are covered. Covers 214 are applied to the array of single dosage medicine containers 200 to provide a completely tamper proof enclosure to, each single dosage liquid medicine container 205 allowing the array of single dosage liquid medicine containers 200 to be stored or transported in any position and also allowing the user to carry each discrete container 205 in any

position. In this embodiment of the present invention, information 212 and 216 is shown to be printed on both the tab portion 210 of the array of containers 200 and other surfaces of the covers 214 on each container 205. However, as mentioned above with reference to FIG. 2A, information 212 and 216 may alternatively be in the form of an RFID tag, or in the form of both printed information and an RFID tag. The RFID tag can be either embedded within tab portion 210 and/or covers 214 or affixed on top of tab portion 210 and/or covers 214. In one embodiment of the present invention, the covers 214 are applied to the array 200 of single dosage medicine containers by adhesive sealing methods.

[0062] FIGS. 2C to 2E illustrate a discrete single dosage liquid medicine container 205 having been removed from an array of single dosage containers 200 as shown in FIGS. 2A and 2B. In this embodiment of the present invention, the discrete container 205 includes a receptacle 218 formed of a base 220 and a conical wall 222. The top of the discrete container 205 includes a flange 224. An upper surface of the flange 224 receives a cover 214 for securing the contents of the discrete container 205. Outer margin 226 of cover 214 is designed to adhesively seal onto flange 224 of the discrete container 205.

[0063] Upon removal of a discrete single dosage liquid medicine container 205, the discrete containers are free of any residual sharp edges. Each discrete single dosage liquid medicine container 205 is broken away from a frangible bridging portion 208 such that the frangible bridging portion 208 remains attached to the frame 206 rather than the discrete container 205. This is especially advantageous when used by elderly patients with fragile skin.

[0064] The cover 214 acts to maintain the integrity of the liquid medication by preventing interaction with potential degradants, such as moisture, oxygen or dust. Information 216, which may be printed or in the form of an RFID tag, or both, on the cover 214 of each discrete container 205 relates to the liquid medicine contained within each discrete container 205, such as content, dose volume, dose information, patient name, patient address, doctor, batch and expiry information, colour code, and/or identification code.

[0065] FIG. 3A illustrates an alternative embodiment of the present invention whereby the plurality of single dosage medicine containers are removably joined to each other in the form of bridging portions 304 provided on flange 318 rather than perforations 206 as shown in FIG. 2A. FIG. 3A also illustrates the display of information 306 relating to the liquid medication in each of the single dosage containers printed on the tab portion 302 of the array 300 of single dosage containers.

[0066] In FIG. 3B, the discrete single dosage liquid medicine container 310 is shown to have been removed from an array 300 corresponding to the embodiment described with reference to FIG. 3A. In, this embodiment of the present invention, the discrete container 310 includes a receptacle 312 formed of a base 314 and a continuous conical wall 316. The top of the discrete container 310 includes a flange 318. The top surface of the flange 318 receives a cover (not shown) for securing the contents of the discrete container 310. As will be described with reference to subsequent drawings, an outer margin of the cover is designed to adhesively seal onto the flange 318 of the discrete container 310. In this embodiment of the present invention, the flange 318 of the discrete container 310 includes bridging portions 304 which were removably joined to bridging portions of at least two neighbouring

single dosage liquid medicine containers in the array **300** as shown in FIG. 3A. Bridging portions **304** of the discrete container **310** shown here in FIG. 3A together with bridging portions of at least two neighbouring containers (not shown in this Figure) are removably joined to each other via a weakened or frangible joint as described with reference to FIG. 3A.

[0067] FIGS. 3C to 3E illustrate a discrete single dosage liquid medicine container **310** having been removed from an array of single dosage containers **300** as shown in FIGS. 3A and 3B. In this embodiment of the present invention, the discrete container **310** includes a receptacle **312** formed of a base **314** and a conical wall **316**. The top of the discrete container **310** includes a flange **318**. An upper surface of the flange **318** receives a cover **322** for securing the contents of the discrete container **310**. Outer margin **324** of cover **322** is designed to adhesively seal onto flange **318** of the discrete container **310**.

[0068] FIG. 3D shows a discrete single dosage liquid medicine container **310** with a partially peeled-off cover **322**. Cover **322** is adhesively sealed to, flange **318** of the discrete container **310**. A user can easily remove the cover **322** and consume the contents residing in the receptacle **312** of the discrete container **310**. A user can consume the contents with cover **322** only partially peeled-off flange **318** or with cover **322** completely removed from flange **318** as shown in FIG. 3C. Such discrete dosage containers **310** may typically range in size from 5 mL to 50 mL.

[0069] As illustrated in FIG. 3E, cover **322** acts to maintain the integrity of the liquid medication by preventing interaction with potential degradants, such as moisture, oxygen or dust. Printed information **306** on the cover **322** of each discrete container **310** relates to the liquid medicine contained within each discrete container **310**, such as content, dose volume, dose information, patient name, patient address, doctor, batch and expiry information, colour code, and/or identification code.

[0070] With reference to FIG. 4A, an alternative embodiment of an integral array **400** of single dosage medicine containers is shown in a planar formation. In this exemplary embodiment, the array **400** of single dosage containers is shown to comprise of fifteen removably joined single dosage medicine containers, whereby the array **400** comprises a matrix of five single dosage medicine containers **402** in a first dimension and three single dosage medicine containers **404** in a second dimension. Also shown in FIG. 4A are frangible portions in the form of perforations **406** between each single dosage medicine container and another. The perforations **406** allow for each single dosage medicine container to be removed, one at a time, from the array **400**. Furthermore, the perforations **406** allow for a selected number of single dosage medicine containers to be removed from the array **400**. For example, a patient prescribed with three doses of medication per day may choose to remove three single dosage medicine containers from the array **400** leaving the three removed single dosage medicine containers attached to each other. Also shown in FIG. 4A is a tab portion **408** of the array **400** of single dosage containers. Tab portion **408** is used for the display of information relating to the liquid medicine contained within the containers. Such information includes, but is not limited to, content, dose volume, dose information, patient name, patient address, doctor, batch and expiry information, colour code, and/or identification code, suitable for scanning.

[0071] FIG. 4B illustrates a discrete single dosage liquid medicine container **410** having been removed from an array **400** of single dosage containers as shown in FIG. 4A. In this embodiment of the present invention, the discrete container **410** includes a receptacle **412** formed of a base **414** and a continuous conical wall **416**. The top of the discrete container **410** includes a flange **418**. An upper surface of the flange **418** receives a cover (not shown) for securing the contents of the discrete container **410**. An outer margin of the cover is designed to adhesively seal onto the flange **418** of the discrete container **410**. In this embodiment of the present invention, the flange **418** of the discrete container **410** includes flat edge portions **420** which were removably joined to the edges of at least two neighbouring single dosage liquid medicine containers in the an array **400** as shown in FIG. 4A. The flat edge portions **420** of the discrete container **410** shown here in FIG. 4B together with flat edge portions of at least two neighbouring containers (not shown in this Figure) are removably joined to each other via perforations **406** in the joints as shown in FIG. 4A.

[0072] FIG. 5A shows a storage tray **500** according to one embodiment of the present invention. The storage tray **500** is shown to comprise of a plurality of slots **502** with each slot **502** configured to receive an array of single dosage containers (not shown in this Figure).

[0073] The storage tray **500** is designed to be placed in a transport mechanism such as a trolley or conveyer belt. In this exemplary embodiment, the storage tray **500** is designed in the form of a rectangular box. However, the storage tray may be designed in any other form depending on its application.

[0074] FIG. 5B shows the storage tray **500** racked with a plurality of arrays **300** of single dosage containers. Each array **300** slides into a slot **502** of the storage tray **500**. The storage tray **500** is designed such that information **324** and **306** printed on each of the single dosage containers and on the tab portion **302** of the array **300** remains visible after placement of the arrays **300** into the storage tray **500** suitably by a transport mechanism associated with support **122** (see FIG. 1). This provides a user with the capabilities of identifying an array **300** of single dosage containers and its contents without removal of the array **300** from the storage tray **500**. In this exemplary embodiment of the invention, information **324** and **306** is shown in the form of printed text. However, in an alternative embodiment of the invention, information **324** and **306** may be in the form of an RFID tag, or in the form of both printed information and RFID tag.

[0075] FIG. 6 illustrates a dispensing hopper **600** according to one embodiment of the invention. Dispensing hopper **600** is designed to carry a plurality of arrays **602** of single dosage containers as described with reference to other figures and is configured to carry arrays of different sizes. Operation of dispensing hopper **600** is controlled by user input device **116**.

[0076] In use, dispensing hopper **600** dispenses one or more arrays **602** of single dose containers onto movable carrier platform **108** as described with reference to FIG. 1. Carrier platform **108** then controls placement of each array of single dose containers and their passage through the filling, sealing, labelling, and checking process.

[0077] FIG. 7A provides a more detailed illustration of the moveable support **220** shown briefly in FIG. 1. In this exemplary embodiment, moveable support **220** is shown in the form of a linear support holding four bulk storage containers **221**.

[0078] FIG. 7B provides a more detailed illustration of the moveable support 320 shown briefly in FIG. 1. In this exemplary embodiment, moveable support 320 is shown in the form of a rotary carousel or cassette holding three bulk storage containers 321.

[0079] In use, the user input device 116 described with reference to FIG. 1 controls either moveable support 220 or 320 to move a selected bulk storage container into a position for dispensing liquid medication. Once the selected bulk storage container is empty or no longer required, the user input device 116 controls the moveable support 220 or 320 to shift in linear fashion or rotate respectively thus moving an alternative bulk storage container into a dispensing position.

[0080] It is to be understood that the above embodiments have been provided only by way of exemplification of this invention, and that further modifications and improvements thereto, as would be apparent to persons skilled in the relevant art, are deemed to fall within the broad scope and ambit of the present invention described herein.

1. A method of delivering liquid medicine from a bulk storage supply into an integral array of single dose liquid medicine containers, said method comprising the steps of:

supporting the integral array of single dose liquid medicine containers;

dispensing liquid medicine from the bulk storage supply into the integral array of single dose liquid medicine containers through a dispensing point; and

controlling the relative position of the integral array and the dispensing point through a user input device so as to fill a selection of the integral array of single dose liquid medicine containers with a selection of liquid medicine from the bulk storage supply.

2. The method of claim 1, further comprising the step of racking the integral array of single dose liquid medicine containers into a storage device.

3. The method of claim 2, further comprising the step of labeling the integral array of single dose liquid medicine containers with printed information relating to one or more of the following details including: content, dose volume, dose information, patient name, patient address, doctor, batch and expiry information, color code, and/or identification code.

4. The method of claim 3, wherein the printed information continues to be visible when racked in the storage device.

5. The method of claim 4, further comprising the steps of verifying the printed information and the mass of the integral array of single dose containers and providing feedback to the user input device.

6. The method of claim 5, wherein each step of the method is controllable through the user input device.

7. The method of claim 6, wherein the user input device is provided with data from at least one external source, such as a local computer or a host system over the Internet.

8. The method of claim 7, wherein the bulk storage supply comprises at least one bulk storage reservoir and wherein each reservoir contains a different liquid medicine.

9. The method of claim 8, further comprising the step of cleaning and sterilizing the dispensing point upon change of

delivery from one bulk storage reservoir containing a first liquid medicine to another bulk storage reservoir containing a second liquid medicine.

10. The method of claim 9, further comprising the step of moving a selected bulk storage reservoir in a dispensing point via a linear support mechanism or a rotary support mechanism.

11. A storage device having one or more integral arrays of removably joined single dose liquid medicine containers stored therein, the storage device comprising a plurality of slots, each slot adapted to hold one integral array of single dose liquid medicine containers such that information printed on each integral array of single dose liquid medicine containers is visible.

12. The storage device of claim 11, wherein each integral array of removably joined single dose liquid medicine containers includes an information tab integrally formed on a lateral edge of the one or more integral arrays of removably joined single dose liquid medicine containers such that the information tab remains visible when each integral array of removably joined single dose liquid medicine containers is stored.

13. An integral array of single dose liquid medicine containers comprising:

a frame;

linking tabs connected to the frame;

a plurality of single dose liquid medicine containers, each single dose liquid medicine container frangibly connected to one or more of the linking tabs, such that each single dose liquid medicine container can be removed from the one or more linking tabs with each single dose liquid medicine container being free of residual sharp edges.

14. The integral array of single dose liquid medicine containers of claim 13, wherein the plurality of single dose liquid medicine containers are separately connected to one or more of the linking tabs allowing a selected single dose liquid medicine container to be individually removed without affecting the integrity of the integral array of single dose liquid medicine containers.

15. The integral array of single dose liquid medicine containers of claim 14, further comprising an information tab integrally formed on a lateral edge of the frame, the information tab including printed information.

16. The integral array of single dose liquid medicine containers of claim 15, wherein the plurality of single dose liquid medicine containers are sealed, and wherein the seal includes printed information.

17. The integral array of single dose liquid medicine containers of claim 16, wherein the printed information relates to one or more of the following details including: content, dose volume, dose information, patient name, patient address, doctor, batch and expiry information, color code, and/or identification code.

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